

404.00 CONSTRUCTION WORK ZONE TRAFFIC CONTROL

404.01 TRAFFIC CONTROL SPECIFICATION REFERENCES

The Project Manager shall prepare Traffic Control Plan and present it at the Preconstruction Conference. The Traffic Control Plan must be approved by the Traffic Engineering Division.

Contract documents include references to traffic control requirements in many locations. Project plans contain references to traffic control requirements in the traffic control plan tabulation usually found on estimate of quantities sheet. Plans may also contain project specific traffic control and/or staging details.

Traffic control specification references are found in:

- *SSHC Section 422* - Temporary Traffic Control Devices
- *SSHC Section 1069* - Temporary Centerline Stripe for Pavements
- *SSHC Section 423* - Traffic Provisions

Traffic control requirements may also be found in the Specification Sections for specific construction activities.

DR Form 502, "Construction Signs and Posts", or a similar computer file shall be used to record transfer of signs to a contractor.

404.02 TRAFFIC CONTROL SIGNING CHANGES

Plan notes indicate signing changes cannot be made without concurrence of the District Construction Engineer and Traffic Engineering [(402) 479-4594]. Field flexibility is required by situations that will not fit standard traffic control layouts such as hilly terrain, permanent signs, guardrail location, or side roads and entrances impacting the location of temporary traffic control signs. Presence of unusual traffic generators that affect volume or high turning movements might also require sign location adjustments.

Evaluate construction work zones prior to installation of traffic control signing, and again when operational, to look for any problem areas that may affect operational quality. Traffic control evaluations shall be held during work hours, on weekends, and during nighttime hours. **Presence of skid marks are a good indication of a problem area.** Early review of proposed traffic control signing situations prior to the preconstruction conference will allow traffic control detail changes to be made prior to impacting public traffic.

Make **immediate** changes when obvious operational problems exist, then call the District Construction Engineer and Traffic Engineering Division as soon as possible to discuss needed changes. For other than obvious operational problems that could be dangerous to motorists or workers, contact the District Construction Engineer and Traffic Engineering Division **first** for concurrence of any proposed changes.

The following modifications to traffic control details **shall not** be made:

- Do **not** change taper lengths
- Do **not** change the sign word message or symbol

- Do **not** change the sign color combination
- Do **not** reduce sign size or alter sign shape

Field adjustments can be made, if necessary, in the following areas **without** Traffic Engineering Division notification and concurrence:

- Individual sign locations may be adjusted up to a maximum of 60 m (200 feet) as long as no two signs, either permanent or temporary, become closer than 60 m (200 feet) apart. Removal, covering, or adjusting of permanent signs in the vicinity of construction work zones should be coordinated with maintenance. Adjustment greater than 60 m (200 feet) must be approved by the District Construction Engineer.
- Paired signs may be adjusted a maximum of 60 m (200 feet).
- Taper location, sequencing arrow location, and corresponding lane merge signs may be adjusted up to 150 m (500 feet) away from construction work area. This is appropriate with poor advance sight distance due to hills or curves, or when earlier detection of a sequencing arrow is needed.

404.03 CONSTRUCTION ZONE ACCIDENT REPORTING

Prior to the start of construction, the District Construction Engineer (DCE) will notify in writing the appropriate Nebraska State Patrol office of the project location and scope. This correspondence should identify location, construction dates, and other pertinent construction project data including names and phone numbers of responsible contact persons from contractor and District Office in case of accident or other construction work zone problems.

If the Nebraska State Patrol determines the NDR needs to make immediate repairs at a construction work zone accident site, the investigating officer will contact the appropriate District office. The DCE will evaluate the request and advise the PM as to what action to take. The Project Manager will then inform the contractor's representative of needed corrective action. When construction work zone accident site does not require immediate corrective action by NDR or contractor representatives, the investigating officer is to report accident to the Project Manager within 12 hours.

Investigation Procedure

When an accident occurs within a construction work zone, the Project Manager will complete DR Form 100 "Construction Zone Accident Report". The report should include pictures, diagrams, traffic control, weather conditions, and other pertinent information as appropriate. Attach a copy of any accident report by other agencies (highway patrol, county sheriff, or city police). Also, attach photographs and a video tape (whenever possible) of the accident site showing location of traffic control devices and other pertinent items.

For accidents resulting in property damage to NDR facilities, the Project Manager shall identify repair costs on DR Form 11, State Property Damage Report. This form is initiated by the Traffic Engineering Division. An example is damage to new guardrail on a staged bridge construction. The District should identify work status when completing the report. Repair costs and supporting documentation should be submitted on the form. An

approved extra work order can be attached to the form to document costs in lieu of completing that part of the form.

The ORM form, Vehicle Accident Report, and the DR form 41, Driver's Motor Vehicle Accident Report shall be completed within 10 days and should be forwarded to the Traffic Engineering Division, State Property Damage Coordinator, 479-4645.

Accident Notification Procedure

The NDOR or contractor staff should report construction work zone accidents to appropriate enforcement authorities (usually Nebraska State Patrol for NDR administered projects) and notify appropriate medical responders if needed. Both the inspection supervisory staff and contractor supervisory staff should be notified promptly. Note additional reporting procedures for severe personal injury or fatality accidents.

Reporting of Severe Personal Injury and Fatal Accidents

If an accident results in a severe personal injury or fatality within a NDR administered construction work zone, immediately notify the Construction Division, District Construction Engineer, and Traffic Engineering Division.

Additional information to be gathered and forwarded by FAX within one working day to the Construction Office, and Traffic Engineering Division includes:

- Project Number
- County
- Route Number
- Direction
- Milepost
- Date of Accident
- Time of Accident
- Contractor
- Traffic Control Required in the Contract Documents
- Approved Traffic Control Modifications
- Brief Description of Facts Surrounding Accident
(Do not include hearsay, assumptions, or unsubstantiated facts.)

404.04 STOP SIGNS ON CONSTRUCTION PROJECTS

Particularly during grading activities, the need arises to frequently move stop signs as intersections are staged to allow access into project corridor. Instructions regarding the placement of stop signs during grading activity are as follows:

- Existing stop signs should be left in place until work in that area necessitates removal. If an intersection does not have an existing stop sign, the appropriate maintenance area supervisor should be notified to install a stop sign immediately. All side roads to primary highways must have a stop sign unless the side road is physically closed.
- At the time work progresses to the point that existing stop sign is no longer in the proper location or in the way of construction activities, the stop sign should be removed by NDR Maintenance. A temporary stop sign with a minimum size of

750 mm x 750 mm (30 inches x 30 inches) should be furnished by NDR Maintenance and placed by the contractor. Temporary stop sign should be mounted approximately 1.5 m (5 feet) high on a 1.5 m (5 feet) Type III barricade or other suitable support furnished by the contractor. See Standard Plan 920. This sign may be moved as needed to allow construction to proceed, but must be maintained in an effective position at all times traffic is staged through the intersection.

- When work at the intersection is completed to the point where the permanent stop sign can be installed, Maintenance should be notified to install the permanent stop sign. This notification should be given on an intersection by intersection basis and not delayed until entire project is completed.

404.05 "ROAD WORK AHEAD" AND "END ROAD WORK" SIGNS

When Traffic Control plans require contractors to place "Road Construction Ahead" (W20-1) and "End Construction" (G20-2) signs at appropriate ends of highway construction projects. On any mainline roadway where a "Road Work Ahead" sign is placed, the opposite end of the work zone shall have an "End Road Work" sign placed.

These signs are required to be in place during and after the milling operation until existing pavement has had a lift of resurfacing placed due to the roughened pavement surface.

404.06 NO PASSING ZONES ON CONSTRUCTION PROJECTS

Often it is necessary to place temporary no-passing zones through a traffic control zone. Guidelines to aid in proper use of no-passing zones follow:

- Never shorten an existing no-passing zone for temporary traffic control.
- If existing no-passing zone is lengthened, a black on orange "No Passing Zone" (W14-3) (pennant) sign should be erected at beginning of no-passing zone and existing black on yellow "No Passing Zone" (W14-3) sign should be removed or covered.
- If temporary no-passing zone falls within existing no-passing zone, no additional signs should be added. Either existing black on yellow "No Passing Zone" sign can remain or be replaced with black on orange "No Passing Zone" sign.
- If no-passing zone ends within 90 m (300 feet) of beginning of existing no-passing zone, then both no-passing zones should be connected to make one continuous no-passing zone. Only one "No Passing Zone" sign should be placed at the beginning of continuous no-passing zone.

404.07 EQUIPMENT AND MATERIAL STORAGE

When maintaining through traffic on construction projects, equipment and materials stored within the right-of-way during nonworking hours should normally be stockpiled as far as possible from the traveled way. Avoid storage areas in the following locations unless protected by temporary concrete barrier, rail or metal beam guardrail:

- Within 9 m (30 feet) of traveled way on primary highways

- Within 15 m (50 feet) of traveled way on interstate highways
- On foreslopes
- On outside of sharp horizontal curves

Other storage locations may be approved by Project Manager when it is not practical to satisfy the above criteria.

- @ Storage behind guardrail must provide for partial collapse of rail upon impact. For beam guardrail this is normally a minimum of **12 feet (3.6 m)** on bull noses and a minimum of **5 feet (1.4 m)** on parallel sections of rail. A minimum of 3.6 m (12 feet) should be allowed behind cable guardrail.

404.08 CONSTRUCTION WORK ZONE SIGNING DURING WINTER SHUTDOWN

Responsibilities of the District Construction Engineer (DCE), District Maintenance Superintendent, and the contractor for highway projects not fully completed by winter shutdown are reviewed below.

Unless contract documents identify signing responsibilities different than stated herein, the following guidelines will apply. Unusual circumstances will be handled on a project specific basis with approval of the Construction Division.

Uncompleted Projects

This category of projects includes contracts having some carry-over work into the next year or intended by plan to be multi-year contracts.

- Prior to winter shutdown, the DCE, PM and Maintenance should field review the project to identify access, signing, and safety features needed to be completed before the contractor suspends work. The DCE and Maintenance will decide which items are contractors responsibilities and what is best accomplished by NDR Maintenance forces. Cost of traffic control devices furnished by NDR Maintenance can be charged against the project.
- During the winter shutdown period, traffic operation services become the responsibility of the NDR Maintenance. This includes routine surveillance and sign maintenance.
- Snow removal for through traffic and local accesses, if needed, is the responsibility of Maintenance.

Multi-Contract Projects

Some projects are phased so a series of contracts are awarded over several years. The most common examples are separate grading and paving projects. Unless contract documents identify responsibility for traffic signing between completion of one project and start of the next project, the Project Manager should evaluate and resolve each specific situation.

Special Concerns

When temporary traffic signals are involved, the contractor shall arrange for emergency maintenance services. No payment will be made to contractor.

On urban projects, DCE will need to coordinate with the city to determine who is responsible for access, signing, and safety features.

404.09 **FLAGGERS & PILOT CARS** (*SSHC Section 422*)

The Department, in conjunction with the AGC, has made the Flagger Certificate quiz, the Flagger Training video, and a Flagger Training audio cassette available in Spanish.

The availability of this material in Spanish in no way is meant to void the specification that requires that flaggers read and speak English clearly. However, in recent years the number of Hispanic workers on our construction projects has increased. The intent is to provide better education to those whose native language is Spanish, realizing that while they may be able to speak English clearly they may have difficulty learning and taking a test in English. You could relate it to learning metrics. While we know and talk metric, few of us really think in metric.

The flagger on a construction project is the first line player in communicating with the driving public. It is imperative that the flagger be able to speak English clearly with the drivers in a work zone. The contractor is responsible for insuring that anyone performing flagging can meet these requirements.

Flaggers may wear the company's hard hat no matter what color it is.

Flagger Bid Item

- @ If the contractor's flagging crew works four hours or less, then ½ flagger day is charged. If the crew works more than four hours, then one flagger day is charged.

Slow/Slow Paddles

- @ The Flagger Handbook indicates that when a flagger is used near the lane-line to warn public traffic of workers and equipment close to the open lane, then these flaggers are only allowed to use a "slow/slow" paddle. This paddle shall be **24 inches (0.6 m)** diamond shaped with the word "slow" in black letters on orange background on both sign faces. The standard stop/slow paddle shall never be used on a multi-lane highway, since through traffic should never be forced to stop on these roadways.

Permanent & Temporary Pavement Marking

Pavement moisture can be measured by placing and holding a two square foot piece of clear plastic on the existing pavement for a period of 15 to 20 minutes. Remove and hold the plastic in a vertical position. If water drips from the underside of the plastic sheet, the pavement has excess moisture.

The slow/slow paddle shall not be used on two-lane primary highways, since the purpose of the stop/slow paddle on these roadways is to actually stop traffic and then allow them to proceed through the traffic control zone under pilot car or flagger control.

Method of Measurement

If an item for flaggers and pilot cars is included in the bid proposal, days are estimated to determine the low bidder. These bid items often overrun due to contractors using multiple work crews at different locations within the same project.

The inspector will count the number of days each flagger (or pilot car) was used. Every flagger and pilot car used and approved by the PM as part of a preplanned work operation is to be paid if their usage is required as a part of required traffic control. Flaggers used solely as a benefit to contractor to help control their own equipment are not to be counted for payment.

404.10 INTERSTATE TRAFFIC CONTROL REQUIREMENTS

Median Crossings

The contractor is prohibited from using any established or other type median crossover on most four-lane divided highway projects unless a crossover is required and drawn in the Plans.

Traffic Control Removal for Head-to-Head Projects

The procedure to remove traffic control devices from head-to-head sections of interstate repair projects has been accomplished differently across the state. To achieve uniform removal practices across the state, the following steps will be used to remove traffic control devices from head-to-head projects:

- Move diverted traffic stream back to its normal side of median.
- Place plastic drums in closed (passing) lane at intervals as prescribed in *Manual on Uniform Traffic Control Devices*.
- Remove all "Two Way Traffic" (W6-3) signs, leaving "Do Not Pass" (R4-1) signs in place.
- Remove double yellow lines with simultaneous removal of tubular markers, "Do Not Pass" signs, and plastic drums. At the same time yellow lines are removed, new white lane lines shall be placed. If lane line painting cannot be accomplished the same day as the double yellow lines are removed, plastic drums shall remain in place effectively closing the passing lane.
- Remove impact attenuator and all temporary barrier rail at upstream end.
- Remove any advance construction work zone signing in the direction towards oncoming traffic.

The entire removal operation shall proceed upstream towards traffic. This will ensure that motorists will have two clear open lanes once they pass traffic control removal operations. Tubular markers shall not be removed in any area until the double yellow lines are removed, unless they are replaced with vertical panels or Type II barricades.

Raised Pavement Markers (*SSHC Section 422*)

Many interstate or other complex project traffic control plans include the use of raised pavement markers to supplement the temporary pavement markings for the project. Raised pavement markers are used in lane shifts or at crossover location to enhance visibility of correct travel path through these areas. Raised pavement markers are very effective if they stay in the correct location on pavement surface.

Off-tracking rear wheels on semi-trailers often dislodge raised pavement markers from the pavement surface. It is permissible to offset the location of the raised pavement markers up to 300 mm (1 foot) laterally away from the temporary pavement marking line to avoid the off-tracking rear trailer wheels.

404.11 CHANGEABLE MESSAGE SIGN GUIDELINES (*SSHC Section 422*)

The Department owns changeable message signs (CMS) stored at various locations statewide. These CMS units are intended to be used for incident management traffic control for major interstate reconstruction, emergency response, temporary road closures for bridge beam replacement, temporary utility crossing requiring road closure, and for other emergency related road closings.

CMS units used for incident management traffic control for major interstate reconstruction projects should have the word message approved by the Traffic Engineering Division, since the appropriate message will vary from project to project. CMS units used for all other situations should also have the word messages approved by the state traffic engineer.

Proposed word messages should be limited to a maximum of 2 panels and usually eight words or less per panel.

CMS units used for project purposes will be under control of the appropriate maintenance office. Repair costs for CMS units used for project related incident management can be charged against project funds using the appropriate documentation.

404.12 FLASHING ARROW PANELS

A listing of currently approved flashing arrow panels is found in the NDR Approved Products List. Manufacturers of flashing arrow panels not currently approved for project use may contact the Materials and Research and Traffic Engineering Divisions to schedule a field review for inclusion in the NDR Approved Products List.

Any flashing arrow panels approved prior to January 1, 1996 must be resubmitted for approval under the new MUTCD requirements.

If any solar arrow panel fails to perform adequately in a field situation, it shall immediately be removed and replaced with a diesel powered arrow panel. The Materials and Research Division and Traffic Engineering Division should be informed if any approved solar arrow panel fails to perform adequately so that the deficient arrow panel model can be dropped from the NDR Approved Products List.

404.13 SIGN MOUNTING DEVICES

SSHC Section 422 states that signs for traffic control zones that are used 24 hours a day are permanent signs that shall be post mounted. Temporary signs may either be post mounted or temporarily mounted.

In urban areas, signs that require post mounting may be skid mounted at the post mounting heights required in the MUTCD provided that skid mounting devices are either a breakaway design or a design that would not become a hazard if hit by vehicles.

404.14 REMOVAL OF TEMPORARY PAVEMENT MARKINGS (*SSHC Section 422*)

Temporary pavement markings are necessary for most construction projects. Typical locations include shooflys, shifts, stage construction, etc. When temporary pavement markings are placed, they will eventually be removed as part of the project.

Removal depends on the type of pavement marking material placed and type of surface to which it is attached (new, old, ACC, or PCC).

Each temporary pavement marking material has its own removal characteristics.

All residue and/or debris shall be removed from the pavement surface when removing temporary pavement marking materials. Any removal process shall not cause damage to the final pavement surface.

It has been brought to our attention that some of the contractors have been using raised pavement markers in place of temporary pavement marking Type I or Type II.

When the project includes the pay item(s) "Temporary Pavement Marking, Type I," "Temporary pavement Marking, Type II," or "Temporary Pavement Marking, Type RPM," only that specific tape or raised pavement marker may be used and paid for at that contract unit price. The contractor is not allowed to use RPMs when the contract bid item is Temporary Pavement Marking, Type II. Only temporary removable preformed tape may be used for Temporary Pavement Marking, Type II.

When the project bid item is "Temporary Pavement Marking" without any type specified, the contractor is allowed to choose between the three different types of markings, provided that the type of material used complies with the plans and specifications. Therefore, if the plans call for TPM Type II at a crossover, for instances, and the other locations do not specify the type of marking, the contractor is required to use Type II markings at the crossover, and may choose to use another material for the rest of the project, providing it complies with the specifications.

Upon completion of the project, any temporary pavement marking which is not intended to remain in place must be removed. This includes stop bars, lane shifts, and any temporary markings left on travel lanes or shoulders.

404.15 WORK AREA SPEED ZONE

Speed Limits in Maintenance Work Areas

For the purpose of establishing speed limits through a maintenance work area, an urban area is defined as the portion of the State Highway System within the corporate limits of a city or village, and a rural area is defined as the portion of the State Highway System outside the corporate limits of a city or village.

Never drop speed more than 20 mph at one point. If 20 mph or greater reduction is needed, phase the drop so that no phase exceeds 20 mph.

When it is deemed necessary to implement a speed limit through a maintenance work area, the following guidelines should be used in determining the value of the speed limit:

Rural Areas

Work activity is being performed in the driving lanes.

Freeways - Normally 50	40 mph
Other State Highways -	35 mph

Work activity is being performed on the shoulder and the work does not encroach onto the driving lane.

Freeways - Normally 50	45 mph
Other State Highways -	40 mph

Work activity is being performed off the shoulder.

No change from statutory limit.

Urban Areas

Freeways

The guideline for determining the value of the speed limit in a rural area for freeways should be used.

Other State Highways

35 mph if the posted speed limit is 50 mph or higher.
25 mph if the posted speed limit is 45 mph or lower.

Special conditions or work activities may occur where speed limits higher or lower than those described above may be appropriate; however, in no situation can a speed limit of less than 35 mph in a rural area, or 25 mph in an urban area, be implemented.

Many maintenance work activities are of short duration (approximately 1/2 day) take place off the roadway or shoulder, or are fast-moving operations. In many cases, the additional exposure to traffic while setting up signing to mark the work area creates a greater hazard than the actual work activity. Work activities of this type may not require work area speed

limit signing and are exempted from the provisions of the guideline regarding speed limits and double fines. In all instances, however, the safety of the worker and the traveling public must be the determining factor. If, in the opinion of the supervisor, a work area speed zone is appropriate, the provisions of the guideline should be followed.

The following activities may not require speed zone signing:

- Survey crew (See existing policy)
- Litter pickup (Adopt-a-Highway)
- Bridge deck inspection (non-snooper) if under 1 hour (snooper)
- Pavement condition and inspection survey
- Deflection testing
- Coring operations
- Traffic counting
- Minor milling (Activity Code 2003)
- Hauling and mixing materials for cold mix (Activity Code 2020)
- Spot patching (Activity Code 2026)
- Grade shoulders (Activity Code 2031)
- Blading unpaved roads (Activity Code 2035)
- Major restoration unpaved roads (Activity Code 2036)
- Maintenance of access and frontage roads (Activity Code 2040)
- Unspecified roadway and shoulder maintenance (Activity Code 2050)
- Drainage structure maintenance (Activity Code 2101)
- Maintaining miscellaneous structures (Activity Code 2102)
- Reshaping ditches and filling washouts (Activity Code 2111)
- Channel cleaning and reshaping (Activity Code 2114)
- Machine mowing (Activity Code 2301)
- Hand mowing (Activity Code 2302)
- Chemical control of insects and roadside trees and shrubs (Activity Code 2303)
- Care and replacement of desirable roadside trees and shrubs (Activity Code 2304)
- Litter pickup (Activity Code 2311)
- Rest area and wayside area operations (Activity Code 2313)
- Seeding and sodding (Activity Code 2315)
- Survey and investigation of junkyard sites (Activity Code 2321)
- Outdoor Advertising Control (Activity Code 2323)
- Fence repair (Activity Code 2332)
- Other roadside maintenance (Activity Code 2350)
- Sign repair or replacement (Activity Code 2401)
- Centerline and edgeline striping (Activity Code 2408)
- Contract striping (Activity Code 2409)
- Signal Repair (Activity Code 2415)
- Highway lighting maintenance (Activity Code 2416)
- Erecting and removing snow fence (Activity Code 2501)
- Brush cutting (Activity Code 2505)
- Snow plowing and spreading of winter chemicals and sand (Activity Code 2511)
- Loading and hauling of snow (Activity Code 2514)
- Stockpiling chemical and sand (Activity Code 2521)
- Correct vandalism or roadside features (Activity Code 2603)

Speed Limits in Construction Work Areas

The maximum speed limit through any construction and maintenance work area shall be 35 mph in rural areas and 25 mph in urban areas, provided signs are in place to give notice of the speed limit.

The Director may raise the 35-mph speed limit in rural areas and the 25-mph speed limit in urban areas, or may delegate the authority to raise the speed limits to Department of Roads' employees in a supervisory capacity. The speed limits shall be raised in 5-mph increments, and cannot exceed the statutory speed limits.

Speed limits above 35 mph in a rural area and 25 mph in an urban area will be effective when the Director, or any officer to whom authority has been delegated, gives a written order for the increase and signs identifying the speed limit are displayed.

Speed limit signs may be mounted on a fixed or movable stand. For a moving-type operation, speed limit signs may be mounted upon moving Department of Roads' vehicles.

Authorization

In order to raise the work area speed limit from 35 mph in rural areas and 25 mph in urban areas, the authorized supervisory employee shall complete a Speed Zone Authorization form identifying the speed limit, highway number, location, and starting and ending times that the speed limit will be in effect. The original Speed Zone Authorization form should be kept in the file of the individual signing the authorization. A copy of the Speed Zone Authorization should be forwarded to the individual in charge of the work crew.

The establishment of speed limits through construction work areas will be determined in the Lincoln office, and will be included in the contract provisions so that a contractor will be aware of a construction speed limit while preparing his/her bid.

If a situation arises where a construction speed limit is needed during the course of a construction project and no provision was made for the speed limit in the contract provisions, or if a speed zone established through the contract provisions needs to be raised or lowered, individuals designated by the Director may establish or alter speed limits in accordance with these guidelines.

Signing (*SSHC Section 422*)

All signing shall conform to the requirements of the *Manual on Uniform Traffic Control Devices*.

Speed limit signs are intended to supplement normal work area signing. They are not intended to replace any of the signs that are now being used, except under certain situations where advisory speed plates are used.

In order to make the "Double Fines" enforceable, the "FINES FOR SPEEDING DOUBLED IN WORK ZONES" sign must be posted at the beginning of each work zone. On all speed limit signs, the "FINES DOUBLED" sign needs to be installed, except for 35 mph in rural areas and 25 mph in urban areas, must be set by utilizing the authorization form. If, for example, within the limits of an interstate construction project, there are two sections under

work which require a reduced speed of 55 mph and the balance of the project maintains a 75 mph speed limit, an authorization form must be completed raising the speed limit on the two sections from 35 mph to 55 mph and the balance to 75 mph.

All existing speed limit signs that conflict with the work area speed limit should be removed or covered during the period of time that the work area speed limit is in effect, except that advisory speed limits that are lower than the work area speed limit being implemented should be left in place. The minimum length of a work area speed zone should be 1/2 mile.

A "Work Area - Speed Zone Ahead" sign should be placed approximately 250 m (800 feet) in advance of the first work area speed limit sign. If the work area is on a steep downhill grade, the 250 m (800 foot) distance should be extended to allow a motorist sufficient distance to decelerate from the statutory speed limit to the work area speed limit. In urban areas where lower speed limits exist, the 250 m (800 foot) distance should be decreased to from 100 m (300 foot) to 200 m (450 foot), depending on the reduction in speed limit that is being implemented through a work area.

The first speed limit sign should be placed approximately 200 m (450 m) in advance of the start of the work area. In urban areas where lower speed limits exist, the 200 m (450 m) distance should be decreased to from 30 m (100 feet) to 100 m (300 feet), depending on the reduction in the speed limit that is being implemented.

The maximum length of a work area speed zone should be one-half mile, with the exception of work operations that are being performed simultaneously at the beginning, through, and at the end of a work area that is longer than one-half mile in length.

A "FINES FOR SPEEDING DOUBLED IN WORK ZONES" signs should be placed 500 to 1000 feet following the first work zone signs with the appropriate speed limit sign with the "FINES DOUBLE" plate 500 to 1000 feet beyond that.

For reduced speed areas, a "REDUCED SPEED AHEAD" sign should be placed approximately 800 feet in advance of the first work area speed limit signs. If the work area is on a steep downhill grade, the 800-foot distance should be extended to allow a motorist sufficient distance to decelerate from the statutory speed limit to the work area speed limit. In urban areas where lower speed limits exist, the 800-foot distance should be decreased to from 200 to 500 feet, depending on the reduction in speed limit that is being implemented through a work area.

The first speed limit sign with the "FINES DOUBLE" plate should be placed in advance of the start of the actual work area.

In reduced speed areas, a speed limit sign with the R2-1wz "FINES DOUBLE" plate shall be repeated at no greater than one mile intervals.

The appropriate standard R2-1 speed limit sign shall be installed immediately following the End Road Work, Thank You Drive Safety sign.

Recordkeeping

It is necessary to keep a daily log of work area speed limits, in the event a court case results from a driver being given a citation for exceeding the speed limit.

The daily log should identify the date, hours the speed limit is in effect, value of the speed limit being implemented, highway number, starting and ending reference posts of the work area speed zone, and in the event a speed limit is implemented on one side of a divided highway, the direction of travel.

404.16 BRIDGE APPROACH GUARD RAILS

On construction projects that require the removal of guardrail at the approaches to bridges, or if the rail has not yet been installed, the following minimum traffic controls should be in place at all unprotected bridge ends whenever traffic is permitted to use the highway:

Two-lane, two-way condition

Three Type III barricades should be in place to the right of the lane approaching the bridge. The barricades should be placed at 15 m (50 foot) centers, with the last barricade placed at the unprotected bridge end.

One Type III barricade should be in place to the right of the lane leaving the bridge (facing traffic approaching from the opposite direction). The barricade should be placed at the unprotected bridge end.

Divided highway condition

Three Type III barricades should be in place both to the right and to the left of the lanes approaching the bridge. The barricades should be placed at 15 m (50 foot) intervals, with the last barricade placed at the unprotected bridge end.

Barricades are not required on the lanes leaving the bridge.

In addition to the barricades at bridge ends, normal signing warning traffic that they are approaching a construction area should be in place.

These traffic controls are applicable to both active construction projects and projects that are held over the winter for completion in the next construction season.

The above traffic controls are intended for use only during the period of time when construction activities require that a bridge end remain unprotected. The replacement of guardrail should be accomplished at the earliest possible date, to eliminate the unprotected bridge end condition.

404.17 INERTIAL BARRIER SYSTEMS

There seems to be some misunderstanding among the contractors about the proper installation of the Type I object marker on the inertial barrier systems. The object marker @ must be placed directly on the front of the first 440 lb (200 kg) module, either by adhesive or rivet, etc. The marker is not to be placed on a separate post in front of the module. The presence of a post in front of the system could effect the crash characteristics of the inertial barrier system.

404.18 BARRICADES/PLASTIC DRUMS

Due to increased usage of plastic drums and Type II barricades on resurfacing projects, and the considerable amount of time involved in testing one of every five devices, we are making the following changes in the minimum tests required:

- When less than 50 are furnished, test one of every five furnished, or a minimum of two each, whichever is greater.
- When 50 or more of any one device are furnished, test one of every ten furnished of that device.